Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-12 (cancelled)

13. (new) A method for determining geometric errors of a rotary encoder with a plurality of increments that can be registered by a sensor, the encoder being for an internal combustion engine and being mounted on a shaft which can be directly or indirectly set in motion by gas moments and moments of inertia, comprising:

measuring a profile of angular velocity $\omega_{mess}(t)$ for a time-variable shaft speed, averaging the shaft speed signals obtained during the measurement and the averaging process being carried out within a shaft speed range in which effects of the gas moments and the moments of inertia, which act on the shaft in the internal combustion engine, on angular velocity substantially cancel each other out statistically, and the geometric errors of the rotary encoder are determined on a basis of the profile of the angular velocity $\omega_{mess}(t)$.

14. (new) The method according to claim 13, wherein a mean angular velocity ϖ_n per shaft rotation n is calculated at least substantially on a basis of measurement of the profile of the angular velocity $\omega_{mess}(t)$.

15. (new) The method according to claim 14, wherein an increment and a related angular velocity $\varpi_R(z)$ is calculated at least substantially from a mean angular velocity ω_R.

16. (new) The method according to claim 13, wherein the increment z and related angular velocity $\omega_n(z)$ is calculated from at least two calculated mean angular velocities ϖ_{n-1} and ϖ_{n+1}.

17. (new) The method according to claim 15,

wherein a profile of the increment z and related angular velocity $\omega_n(n)$ are represented by a polynomial.

18. (new) The method according to claim 16, wherein a profile of the increment z and related angular velocity $\omega_n(n)$ are represented by a polynomial.

19. (new) The method according to claim 17, wherein the increment z and related angular velocity $\omega_n(z)$ is obtained as a function value of a function described by the polynomial.

20. (new) The method according to claim 18, wherein the increment z and related angular velocity $\omega_n(z)$ is obtained as a function value of a function described by the polynomial.

21. (new) The method according to claim 16, wherein the averaging is a linear averaging which is carried out over the increment z and related angular velocities $\omega_n(z)$ per increment z and shaft rotation n on a basis of a relationship which gives an incremental angular error per rotation as geometric error:

$$\Delta\varphi_{e_n}(z) = \frac{1}{k-l}\sum_{n=1}^{k}\left[\frac{\omega_n(z)}{f(z)} - \Delta\varphi_i(z)\right]$$

where $\Delta\varphi_{en}(z)$	incremental angular error per rotation
$\omega_n(z)$	incremental angular velocity per rotation
$f(z)$	increment frequency
$\Delta\varphi_i(z)$	angular increment for ideal increment
k, l	rotation indices for lower and upper speed limit

22. (new) The method according to claim 19, wherein the averaging is a linear averaging which is carried out over the increment z related angular velocities $\omega_n(z)$ per increment z and shaft rotation n on a basis of a relationship which gives an incremental angular error per rotation as geometric error:

$$\Delta\varphi_{e_n}(z) = \frac{1}{k-l}\sum_{n=1}^{k}\left[\frac{\omega_n(z)}{f(z)} - \Delta\varphi_i(z)\right]$$

where $\Delta\varphi_{en}(z)$	incremental angular error per rotation
$\omega_n(z)$	incremental angular velocity per rotation
$f(z)$	increment frequency
$\Delta\varphi_i(z)$	angular increment for ideal increment
k, l	rotation indices for lower and upper speed limit

23. (new) The method according to claim 13,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

24. (new) The method according to claim 14,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

25. (new) The method according to claim 15,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

26. (new) The method according to claim 16,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

27. (new) The method according to claim 17,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

28. (new) The method according to claim 18,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

29. (new) The method according to claim 19,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

30. (new) The method according to claim 20,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, a towing or a compression test.

31. (new) The method according to claim 21,
wherein the time-variable shaft speed is obtained as part of one of a coast-down, towing or compression test.

32. (new) The method according to claim 13,
wherein the shaft speed range within which the effects of the gas moments and moments of inertia on the shaft speed cancel each other out statistically, are selected such that initially a surge speed is sought for which a phase shift occurs in the shaft speed signals caused by a change in dominance between gas moments and moments of inertia, with the speed range being selected about the surge speed such that an alternating component obtained in the speed signal is as small as possible after averaging.

33. (new) The method according to claim 19,
wherein the speed range within which the effects of the gas moments and moments of inertia on the shaft angular velocity cancel each other out statistically, is selected such that an incremental angular error $\Delta\varphi_{en}(z)$ is determined as a function of the shaft speed and that a speed range in which the angular error is smallest is selected.

34. (new) A method according to claim 13,
wherein for an internal combustion engine having an odd number of cylinders, an arbitrary speed range is used to measure the angular velocity when determining the geometric errors.

35. (new) A method for compensating for geometric errors of a rotary encoder with a plurality of increments that are registerable by a sensor, the encoder being for an internal combustion engine and being mounted on a shaft which can be directly or indirectly set in motion by gas moments and moments of inertia, comprising
the geometric error being determined according to claim 13 and

an incremental angular geometric error $\Delta\varphi_{en}(z)$ being obtained and used for correction when determining the speed of the internal combustion engine.